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## Cultivating learning and social interaction in an international classroom through small group work; a quasi-experimental study

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## CULTIVATING LEARNING AND SOCIAL INTERACTION IN AN INTERNATIONAL CLASSROOM THROUGH SMALL GROUP WORK

A quasi-experimental study

*Novie Johan and Bart Rienties*

Globalisation demands that graduates be culturally adept: Cross-cultural experiences within an international classroom are an important part of contemporary higher-education agendas (Kimmel and Volet, 2012; Montgomery, 2009; Rienties, Johan, and Jindal-Snape, 2014). The opportunities for learning from other cultures is noted as one of the reasons that international students study abroad (Merrick, 2004). Patterson, Carrillo, and Salinas (2012) documented that cross-cultural learning could bring a number of advantages for both host-national and international students, such as understanding and appreciation of the world, ability to think critically, ability to integrate multiple perspectives, and acquisition of global knowledge, hence being able to work effectively in a global world. While studying abroad is increasingly common (Brisset, Safdar, Lewis, and Sabatier, 2010; Montgomery, 2009), research consistently suggests that international students continue to face a number of transitional challenges (Rienties, Beusaert, Grohnert, Niemantsverdriet, and Kommers, 2012; Ye, 2006; Zhou, Jindal-Snape, Topping, and Todman, 2008).

According to Hanassab (2006), diversity in every sense is central to the university experience. Yet truly international education can be achieved only through understanding, communication, and cooperation among cultures of various backgrounds (Döring *et al.*, 2010; Rienties and Nolan, 2014; Summers and Volet, 2008; Ward, Bochner, and Furnham, 2001; Zhou *et al.*, 2008). This can be attained by allowing students more exposure to other cultures, which can increase the understanding of the complexities of their culture and those of others. Furthermore, students who are assisted in challenging their original cultural assumptions can maximise the opportunity presented by the cross-cultural interactions within an international classroom (Chang, 2006; Kimmel and Volet, 2012; Rienties and Nolan, 2014). Nevertheless, Kimmel and Volet (2012, p. 158) argue that while ‘promoting positive interactions and productive

intercultural learning on international campuses is on the agenda of all universities hosting large numbers of international students', the international classroom reality suggests that 'student-led group activities conducted with peers from culturally diverse backgrounds appear challenging'. If a functional international classroom is to be achieved, there needs to be mutual effort in overcoming the barriers among students and teachers from all cultures.

We argue that it is important for teachers and institutions to build a sense of community and belonging within an international classroom, allowing students to be open and willing to take risks in getting to know one another (Curşeu and Pluut, 2011; Decuyper, Dochy, and Van den Bossche, 2010; Kimmel and Volet, 2012; Neri and Ville, 2008; see also Chapters 2 and 4). However, in a recent review of internationalisation literature, Volet and Jones (2012, pp. 255–56) argued that 'change in international and local students' engagement in intercultural interactions over a period of time has attracted limited empirical attention.... Intervention studies aimed at enhancing intercultural engagement among local and international students tend to be small scale, descriptive, and lacking methodological rigor'. In response to Volet and Jones (2012), we developed a quasi-experimental study using social network analysis in a pre- and post-test manner amongst 151 third-year students in an international classroom. The results indicated that a teacher's 'disruption' of the group selection process led to more cross-cultural learning links over time than when students were allowed to self-select their peers (Rienties and Johan, 2014). Although this study provided important insights that teachers can actively intervene in the cross-cultural dynamics in- and outside the classroom, it did not focus specifically on the impact of behaviour and cognition of host-national and international students. Using principles of affective-behavioural-cognitive (ABC) theory (Brisset *et al.*, 2010; Ward *et al.*, 2001; Zhou *et al.*, 2008), in our follow-up study we examine in this chapter whether group work divisions (controlled versus self-selected) impacted host-national and international students' affect, behaviour, and cognition over time.

### **International classroom: A challenging environment**

According to Westrick (2005), an international classroom is often an ingredient of increased world-mindedness, as it acts as a heterogeneous community of learning. Through this community of learning (Rehm, Gijsselaers, and Segers, 2014), the reservoir of knowledge that each student brings to the international classroom can be exchanged and distributed. Information that is offered by international students about their own country and how things are done there could serve as a major contribution to a community of learning (Rehm *et al.*, 2014; Rienties and Johan, 2014). This sharing in heterogeneous communities can enhance both host-national and international students' accumulation of worldwide knowledge. We define an international classroom as a cross-cultural learning context whereby at least three substantial groups of students

from different nationalities are present in the classroom and at least 40 per cent of the student population comprises international students.

Networks of support in international classrooms are of particular importance for host-national and international students' *affect*, especially when dealing with stress and coping (Montgomery and McDowell, 2009; Rienties *et al.*, 2012; Rienties and Nolan, 2014; Ward *et al.*, 2001; Zhou *et al.*, 2008). Sawir, Marginson, Deumert, Nyland, and Ramia (2008) suggest that social networks often serve as a student's support system (see also Chapter 1, resilience theory). While having associations with those with the same language may give international students feelings of familiarity and support (Brown, 2008; Sawir *et al.*, 2008), frequent interaction with host-national classmates proved to be useful in helping international students with their psychological and sociocultural adaptation (Neri and Ville, 2008; Rienties *et al.*, 2012; Rienties and Nolan, 2014) (see Chapters 6, 9, and 11 for similar or contradictory discussions). According to Montgomery and McDowell (2009), students use their social networks to share information and to help one another in their academic work as well as for daily support, thereby shaping their behaviour and cognition. In doing so, these social networks become more international and global.

Work assigned to culturally mixed groups is among the best pedagogical tools available for teachers in international classrooms, as it encourages host-national and international students to interact with one another within a module (Hills and Thom, 2005; Peacock and Harrison, 2009, see also Chapters 1 and 4 and see Chapter 11 for teachers' cognition of mixed-group work). Chang (2006) documented three main advantages of mixed-group work: exposing students to different experiences and values, allowing them to learn as a team in a diverse group, and providing an effective structure for students' learning and social life in a university. However, Gabb (2006, p. 363) noted that 'the social dynamics of mixed cultural groups are by definition different from those that are monocultural'. Hence, putting students together in an international classroom is only a starting point for students to learn about cross-cultural interactions (Hills and Thom, 2005) and does not necessarily guarantee smooth interactions among these different cultures (see also Chapters 2, 4, and 8).

The main challenges affecting mixed-group work are related to differences in cultural values, differences in English language skills, stereotyping, communication issues, unequal commitment to the group, and different grading expectations (Brown, 2008; Peacock and Harrison, 2009; Turner, 2009; see also Chapter 11). These challenges often cause a lack of contact and interaction between host-national and international students. More worryingly, cultural differences in an international classroom may lead to stereotyping behaviour (Montgomery, 2009; Peacock and Harrison, 2009). According to Turner (2009), stereotyping is a common theme among British and international students, which needs to be monitored, minimised, and challenged to increase understanding, tolerance, and positive attitudes towards

working in mixed groups. While differences in language proficiency are often blamed for cross-cultural issues in an international classroom, Brown (2008) argues that language is not necessarily the inhibitor for students' intercultural interactions and this applies to both host-national and international students. Yet, students have a tendency to link language proficiency to perceived academic skills, or work ethics, so even when language is not an issue, a preference remains to work in homogeneous groups (Kimmel and Volet, 2012; Rienties and Johan, 2014).

Another challenging factor for mixed-group learning is (perceived) differences in grading. At times, students perceive difficulties associated with working in mixed groups as potentially threatening to their ability to get good marks (Kimmel and Volet, 2012; Montgomery, 2009; Montgomery and McDowell, 2009; Peacock and Harrison, 2009; see Chapter 11). Perhaps owing to these associated stereotypes, Kimmel and Volet (2012) found that while international students tend to appreciate academic tasks conducted in mixed groups, the opposite generally applies to host-national students. Similarly, Montgomery (2009) found that British and international students preferred to stay with those from their own culture. In essence, a preference to work with peers from one's own culture is a risk-avoidance behaviour, which has an impact on the cognition and affect of both host-national and international students (but see Chapter 9 for an alternative interpretation).

### Influencing learning networks through group distribution

A growing body of research has found that students tend to prefer working with their friends and those of similar cultural backgrounds (Chapman, Meuter, Toy, and Wright, 2006; Rienties, Alcott, and Jindal-Snape, 2014; Rienties, Heliot, and Jindal-Snape, 2013; Summers and Volet, 2008). When students are allowed to self-select members of their group, students mostly select their own friends or those from similar cultural backgrounds (Rienties, Alcott, *et al.*, 2014; Rienties and Johan, 2014). This is not all negative, as self-selected groups carry their own advantages, such as trust building and knowledge transfer (Chapman *et al.*, 2006), yet these are not the only important interaction outcomes sought during students' education. If they are to learn other key skills from a cross-cultural setting, students need to accept the occasional initial discomforts of working with those with whom they are not familiar.

When a teacher creates a mixed group, opportunities for cross-cultural learning are purposefully imposed upon host-national and international students. While some inefficiencies may occur during this process, such as creating additional pressure leading to stress and anxiety, potential benefits of cross-cultural learning may include new knowledge, cross-cultural awareness, and skills (Curşeu and Pluut, 2011; Rienties, Heliot, *et al.*, 2013; Rienties, Johan, and Jindal-Snape, 2015). As a process and outcome, cross-cultural interactions may allow both host-national and international students to form a close-knit

learning environment. This social network not only may benefit them during their study period but also may serve as a reservoir for future social capital links after graduation. In essence, the ability to be part of a mixed group will allow host-national and international students to graduate with crucial generic and employability skills, such as communication, intercultural awareness, and ability to work in groups (Curşeu and Pluut, 2011; Rienties, Alcott, *et al.*, 2014). Furthermore, mixed groups are reported to excel in terms of their ability to arrive at more creative solutions, insights, and approaches as compared to mono-cultural groups (Curşeu, Janssen, and Raab, 2012). Interestingly, if mixed groups of host-national and international students are given a challenge with high levels of authenticity and complexity and clear assessment criteria, the students are more likely to be closer and stronger as a group (Rienties, Hernández-Nanclares, Jindal-Snape, and Alcott, 2013; Rienties *et al.*, 2015; Rienties and Nolan, 2014). With this in mind, any initial reluctance for embracing cross-cultural group work (Rienties, Hernández-Nanclares, *et al.*, 2013; Zhou *et al.*, 2008), such as fear of difficulties in creating or maintaining group dynamics (Decuyper *et al.*, 2010), potential influence on participants' grades (Peacock and Harrison, 2009; Rienties, Alcott, *et al.*, 2014), and possible stress that results from the initial adjustment (Kimmel and Volet, 2012), should not be seen as a hindrance, as these are merely temporary setbacks. Building on our initial study (Rienties and Johan, 2014), we will examine whether a group allocation approach (controlled versus self-selected) has an influence on host-national and international students' affect, behaviour, and cognition.

## Study

### Methods

Our study involved 151 third-year undergraduate students enrolled in the hospitality ( $n = 81$ ) and tourism management ( $n = 70$ ) programme at a university in the UK in two spring semesters of 2012 and 2013. The students' average age was 23.13 years ( $SD = 2.51$ ), with an 80:20 split between female and male participants (120:31 students). Confucian Asia was home to 51 per cent of the classroom students, followed by Anglo Saxon descent (26 per cent), Eastern Europe (16 per cent), Latin Europe (4 per cent), Southern Asia (4 per cent), Sub-Saharan Africa (3 per cent), Germanic Europe (2 per cent), and Latin America (1 per cent), which is in line with GLOBE categorisation.

In spring 2012, students in an international classroom were put into ten mixed groups by the teacher (*i.e.*, controlled condition). This distribution was based on the first survey of social network completed by the students on the first day of their class; the groups of about eight students each ( $M = 8.10$ ,  $SD = 0.74$ ) were formed by the second week of the class, ready to start their weekly tasks. In contrast, students in spring 2013 formed twelve groups in which they were allowed to self-select their group members (*i.e.*, self-selected condition),

whereby the group size varied between five and seven members ( $M = 5.83$ ;  $SD = 0.94$ ).

With the exception of how the groups were created, all teaching and learning conditions were the same for both 2012 and 2013 classes: The same teacher led the two modules, and comparable lecture materials and assessments were given. In line with recommendations from group research (Curşeu and Pluut, 2011; Patterson *et al.*, 2012; Rehm *et al.*, 2014; Ye, 2006), each group was asked to meet on a regular basis (online and face to face) every week to discuss the topic of the week and to complete their weekly task, in addition to attending their formal three-hour lectures. During the lecture sessions also, students were asked to participate in group-related activities, to check on their understanding of the materials and the outcome of their previous informal group meetings. Despite the fact that the group assessment was not part of the summative assessment, monitoring and formative feedback were provided on a regular basis via the virtual learning environment (VLE) as well as during class discussions. The details of the module design and more discussions on group development in these two international classrooms are available in Rienties and Johan (2014). In our first study, we had found that students in the two conditions were comparable in terms of age, academic performance, gender, and mix of nationalities (Rienties and Johan (2014).

We used social network analysis (SNA) to analyse how students built, maintained, and changed their social network over time (see also Chapters 4, 8, and 14 for an understanding of SNA). According to Hommes *et al.* (2012), SNA is a powerful methodological approach used to illustrate the relationships between learning processes and the relationships of those undertaking the learning, highlighting the importance of the aspects of learning that can be gained from the students' own social network (Hommes *et al.*, 2012). The instruments used for this study consisted of a pre- and post-questionnaire (i.e., pre- and post-test), the first questionnaire being distributed in the first class (week 1). The pre-test could be regarded as a proxy for students' *affect* towards cross-cultural interactions and social network formation, before students were allocated to their respective condition. As students had already worked together for six to twenty-four months, students had ample time to build, maintain, and deconstruct social relations. The second questionnaire was distributed during the last class of the module (week 11), which could be regarded as a proxy for *behaviour* (and reaction towards the instructional design): how students built, maintained, and deconstructed their social networks within an international classroom during those eleven weeks. Both questionnaires required students to identify: 'I am a friend of ...', 'I have learned a lot from ...', and 'I have worked a lot with ...'. Using closed-network analyses (Rienties, Hernández-Nanclares, *et al.*, 2013), the pre- and post-test measurements were compared to identify any changes that may have occurred within and among the groups in each condition. For the controlled condition, response rates were 83 per cent and 67 per cent, whereas for the self-selected condition the response rates were 84 per cent and

86 per cent, respectively. In terms of *cognition*, the final mark of the module consisted of a midterm and written final examinations, consisting of open-ended essay questions. Furthermore, grade point average (GPA) of third-year performance was included as a proxy for long-term cognition.

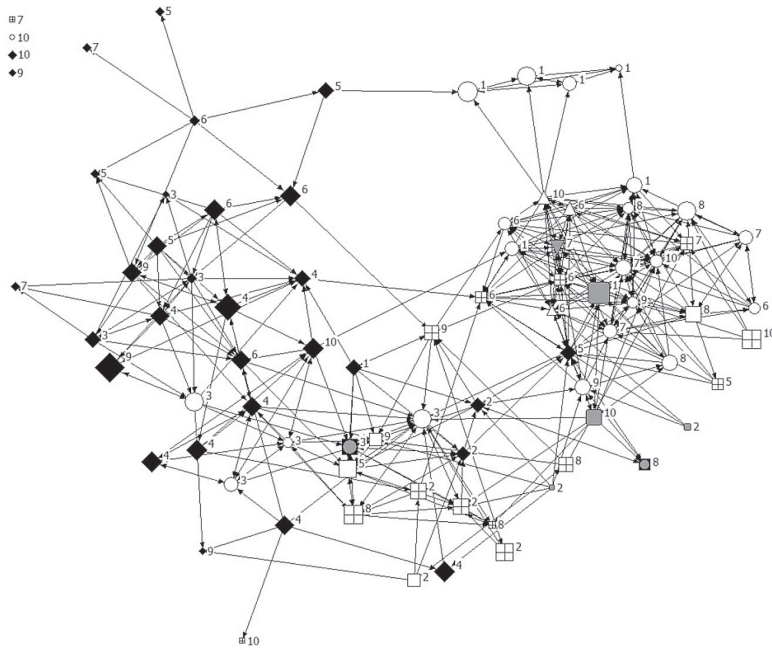
## Results

Figures 13.1 and 13.3 illustrate the before and after social learning networks for the controlled condition, whereas Figures 13.2 and 13.4 illustrate the before and after social learning networks for the self-selected condition. In both Figures 13.1 and 13.2, Confucian Asian students (blue diamond) were well connected to one another at the start of the module. However, Confucian Asian students were relatively isolated from most English and Western international students, as was found in previous studies (Rienties and Johan, 2014; Rienties, Johan, *et al.*, 2014; Rienties and Nolan, 2014). Not surprisingly, when students were given an opportunity to self-select their group, most students chose group members whom they already knew – those with whom they were friends or from whom they learned. This can be observed in Figure 13.2 (see groups 8 and 12, located on the left side). The fact that in both conditions relatively clear geo-cultural segregations were visible indicates a less-than-integrated international classroom, even when students had already worked extensively together over a long period.

In the controlled condition (see Figures 13.1 and 13.3), students were ‘forced’ to work together with their group members, regardless of their preference (Rienties and Johan, 2014; Rienties, Johan, *et al.*, 2014). For example, group 9 consisted of four Confucian Asian (left, Figure 13.1), two English, and two international students (middle and right, Figure 13.1) who were positioned relatively far apart from one another at the start of the module.

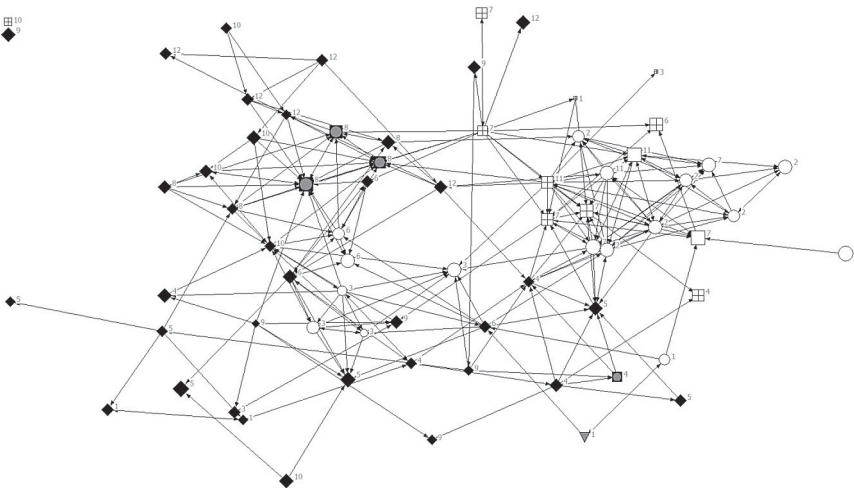
By week 11, the consequences of the self-selected and controlled conditions became apparent. Self-selected group members built stronger learning relations within their own group, but the segregated geo-cultural clusters remained, whereby most host-national and Western international students were positioned on the right in Figure 13.4, while Confucian Asian international students were positioned primarily on the left of the social network. In contrast, in the controlled condition, students created new mixed-group connections during their formal and informal learning periods (see Figure 13.3). For example, at the end of the module, group 9 members were directly and/or indirectly connected with one another. The Confucian Asian students in group 9 had moved closer to English and Western international students (middle and top, Figure 13.3), whereas they previously were part of a different social network and were positioned relatively far away from those students (see Figure 13.1).



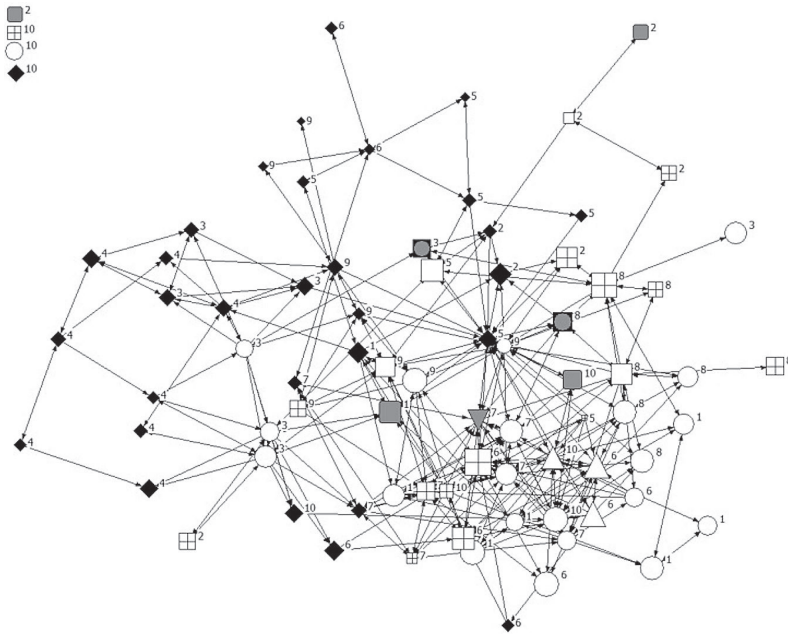


**FIGURE 13.1** Initial social learning network (week 1), controlled condition

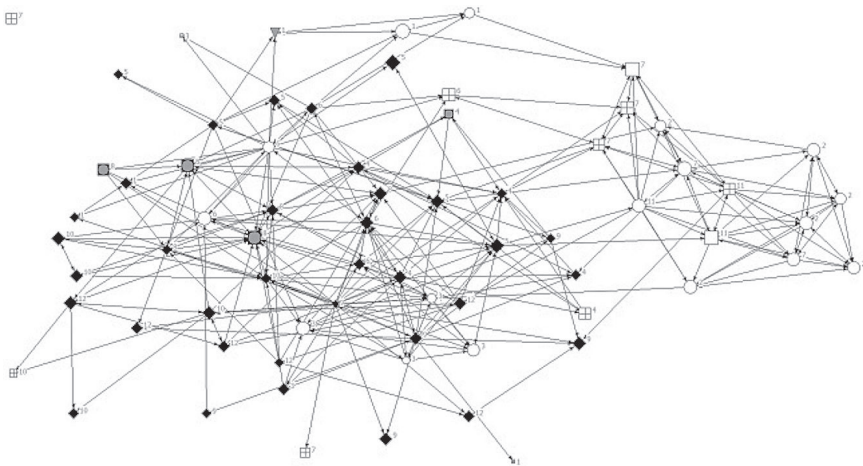
Group numbers are presented for each node. The regional distributions are illustrated in various shapes and colours: Anglo-Saxon (white circle); Latin Europe (white square); Germanic Europe (white up triangle); Eastern Europe (white green box); Sub-Saharan Africa (grey circle); Middle East (grey down triangle); Southern Asia (grey circle in black box); Confucian Asia (black diamond). The size of each node is related to the final grade of the respective module



**FIGURE 13.2** Initial social learning network (week 1), self-selected condition



**FIGURE 13.3** Ending social learning network (week 11), controlled condition



**FIGURE 13.4** Ending social learning network (week 11), self-selected condition

**TABLE 13.1** Friendship, GLOBE, and learning links within and outside groups (M1 vs M2)

	Controlled condition		Self-selected condition		F value	$\eta^2$
	M	SD	M	SD		
<i>Beginning of the module (Week 1)</i>						
Friendship relations within group	1.63	1.32	3.00	1.45	36.880**	0.20
Friendship relations outside group	8.57	5.26	9.54	5.00	1.349	0.01
E-I friendship relations	0.66	0.32	0.48	0.27	13.496**	0.08
Same GLOBE relations within group	2.40	2.08	2.89	1.90	2.258	0.02
Different GLOBE relations within group	4.77	2.30	2.09	1.88	60.322**	0.29
E-I GLOBE relations within group	0.32	0.61	-0.14	0.76	16.898**	0.10
<i>End of the Module (Week 11)</i>						
Learning relations within group	2.72	1.98	2.49	1.35	0.678	0.01
Learning relations outside group	3.58	3.64	5.23	3.86	7.294**	0.05
E-I index learning relations	0.01	0.54	0.29	0.36	13.781**	0.08

ANOVA of controlled (n = 81) versus self-selected condition (n = 70). \*\* $p < 0.01$ , \* $p < 0.05$



FIGURE 13.5 E-I index of culture of learning (left) and friendship (right)

### *Linking affect, behaviour, and cognition*

Statistical analyses (Table 13.1) indicated significant differences between internal and external group friendships between the controlled and self-selected conditions at the beginning of the module:

- Those who were in the self-selected condition had more friends (3.00) within their group than did those in the controlled condition (1.63).
- Self-selected groups had a significantly lower number of members from different cultural backgrounds (2.09) than did those in the controlled condition (4.77).

In line with our expectations, Figure 13.5 illustrates that in the controlled condition over time, students developed more cross-cultural learning links as they were put into mixed groups, as our proxy for cross-cultural learning and friendship (the external-internal (*E-I*) index) was higher at the post-test M2 and above zero, indicating more cross-cultural than co-national learning links. Even though learning networks in the self-selected condition were slightly more externally focused towards cross-cultural learning relations over time (left, Figure 13.5), students in the controlled condition had significantly more cross-cultural learning links. Furthermore, the friendship networks of the self-selected condition became more internally focused on students with similar cultural backgrounds (i.e., the *E-I* index became significantly more negative).

Table 13.2 illustrates cognition and academic performance of the module in the two conditions, split by host-national students and three clusters of international students. A significant difference was found in the final marks between the controlled and self-selected condition, students in the controlled condition on average performing better on the midterm and final exam. Host-national students and Western international students had substantially higher final marks and GPAs in comparison to non-Western and Confucian Asian international students, irrespective of the two conditions. As indicated in Figure 13.6, where we compared the final mark obtained in the module relative to GPA of the respective cohort, host-national students and the three clusters of international students in the controlled condition seemed to perform better in comparison to those in the self-selected condition.

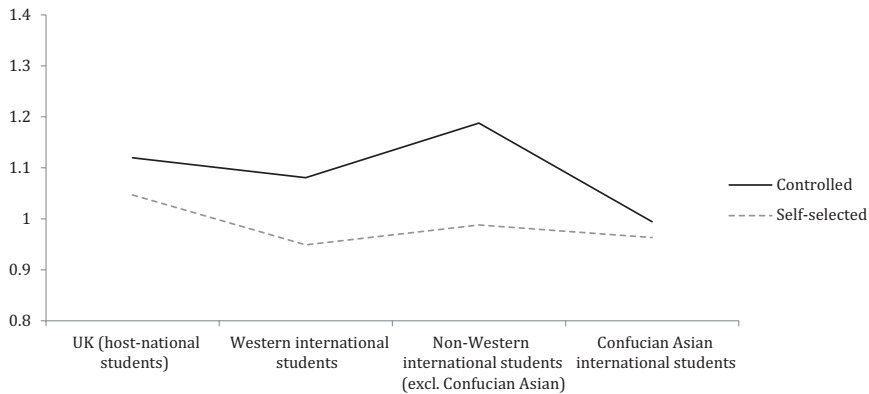
TABLE 13.2 Cognition: Final exam and GPA

	Controlled condition		Self-selected condition		F value	$\eta^2$
	M	SD	M	SD		
Final mark module	67.85	18.28	59.93	16.02	7.826**	0.05
Host-national students	76.56	12.20	68.87	15.45	3.018	0.08
Western international students	68.55	24.30	57.45	23.42	1.542	0.05
Non-Western international students (excl. Confucian Asian)	66.31	21.42	59.60	12.31	0.391	0.04
Confucian Asian international students	61.56	14.27	56.52	12.77	2.323	0.04
GPA	61.90	8.01	60.84	7.88	0.660	0.04
UK (host-national students)	68.38	4.85	65.79	6.03	2.221	0.06
Western international students	63.44	8.37	60.55	9.60	0.841	0.26
Non-Western international students (excl. Confucian Asian)	55.83	5.72	60.32	7.27	1.058	0.10
Confucian Asian international students	61.90	8.01	58.67	7.35	3.039	0.05

GPA = grade point average

ANOVA of controlled (n = 81) versus self-selected condition (n = 70). \*\* $p < 0.01$ , \* $p < 0.05$ .

Host-national students (n = 22, n = 17), Western students (n = 21, n = 11), non-Western (n = 7, n = 5), Confucian (n = 31, n = 36), respectively.



**FIGURE 13.6** Performance of host-national and international students relative to their grade point average (controlled vs self-selected)

Finally, in Table 13.3 we correlated the social learning networks at the beginning and end of the module (as a proxy for affect and behaviour) in the two conditions with final mark and average GPA. As not all students had fellow co-national students, according to Rienties and Nolan (2014) we used the GLOBE categorisation as a proxy for similarity in culture. In both conditions, having more learning links at the beginning of the module was positively related to module and academic performance, with Pearson correlation coefficients ranging between 0.25 and 0.65. In both conditions, having more cross-cultural learning links at the beginning was positively related to academic performance. At the end of the module, having more learning links was again positively related to cognition. However, having more links with peers from similar cultural backgrounds was not significantly related to academic performance. In contrast, cross-cultural learning links were positively related to academic performance, in particular for the controlled condition (as also indicated by the positive E-I index).

## Discussion

The opportunities for learning from other cultures is noted as one of the reasons for international students to study abroad (Hanassab, 2006; Merrick, 2004). Networks of support in international classrooms are of particular importance for host-national and international students' affect, behaviour, and cognition (Rienties and Nolan, 2014, see also Chapters 1 and 4; Ward *et al.*, 2001; Zhou *et al.*, 2008). However, a vast body of literature (several chapters in this book in particular) indicate that host-national and international students do not 'automatically' develop strong, interconnected social networks with one another. Some of the main challenges affecting mixed-group work are related to differences in cultural values, communication issues, stereotyping, and work ethic expectations that may relate to differences in perceived impacts

**TABLE 13.3** Correlation matrix between social network behaviour and cognition (controlled vs self-selected condition)

	Controlled condition		Self-selected condition	
	Final mark	Average GPA	Final mark	Average GPA
Learning links at beginning of module (M1)	0.528**	0.648**	0.246*	0.536**
Learning links within same culture	0.283*	0.195	0.039	0.391**
Cross-cultural learning links	0.389**	0.583**	0.287*	0.435**
E-I index culture	0.058	0.313**	0.309**	0.204
Learning links at end of module (M2)	0.293**	0.439**	0.238*	0.344**
Learning links within same culture	0.141	0.108	0.033	0.182
Cross-cultural learning links	0.262*	0.440**	0.287*	0.285*
E-I index culture	0.139	0.385**	-0.006	0.016

GPA = grade point average; E-I =  
Pearson correlation of controlled (n = 81) versus self-selected condition (n = 70). \*\* $p < 0.01$ , \* $p < 0.05$

on grades (Brown, 2008; Peacock and Harrison, 2009; Turner, 2009). In response to Volet and Jones's (2012) call for more robust intervention studies in internationalisation research, we developed a quasi-experimental study using SNA in a pre- and post-test manner amongst eighty-one versus seventy third-year students in an international classroom, in which we 'disrupted' the group selection process. Using principles of ABC theory (Ward *et al.*, 2001; Zhou *et al.*, 2008), we examined whether group work divisions (controlled versus self-selected) had an impact on host-national and international students' affective, behavioural, and cognitive processes over time.

We found supporting evidence that culturally mixed-group work is an appropriate pedagogical tool for teachers in international classrooms to encourage cross-cultural interaction between host-national and international students (see also Chapters 8 and 14). Students in the self-selected condition developed stronger learning relations within their own group. In contrast, students in the controlled condition were more compelled to work with the mixed-group members. Figure 13.5 illustrated that students in the controlled condition over time developed more cross-cultural learning links as they were put into mixed groups, while friendship networks of the self-selected condition became more internally focused on students with similar cultural backgrounds.

A new contribution of this follow-up study of Rienties and Johan (2014) is that we linked social network affect and behaviour of host-national and international students with cognition (academic performance). A significant difference was found in final marks between students in the controlled versus self-selected condition, whereby students in the controlled condition on average performed better on the midterm and final exam. However, one has to be careful about making sweeping statements based upon this difference. Even though average GPA across the two conditions, and subsequent cultural background categorisations, were comparable (i.e., indicating that the two cohorts were comparable in academic ability) and the midterm and final exam were double-blind-marked, several other factors beyond group division methods might explain this difference.

Interestingly, in both conditions, having more learning links at the beginning of the module was positively related to module and academic performance. However, in both conditions, having more cross-cultural learning links at the beginning was positively related to academic performance. At the end of the module, having more learning links with students from similar cultural backgrounds was not significantly related to academic performance. In contrast, cross-cultural learning links were positively related to academic performance, in particular for the controlled condition (as also indicated by the positive E-I index). This could be regarded as a positive finding for advocates of cross-cultural learning, as positive affects towards cross-cultural learning and actual behaviour to build such networks over time seems to have a positive impact on cognition. In this way, our findings relate and strengthen the fundamental layers of the ABC model (Ward *et al.*, 2001; Zhou *et al.*, 2008).



## Limitations

While utmost care was applied for the design and development of the instruments of this study, two limitations remained: first, both pre- and post-questionnaires are self-reported instruments, and second, further investigations on what actually occurred during the eleven weeks of learning process were not part of the instruments of this study. Nevertheless, SNA technique has been well documented for its effectiveness in forecasting social networks and learning outcomes as long as the study is longitudinal and has high response rates (Hommes *et al.*, 2012; Rehm *et al.*, 2014; Rienties and Nolan, 2014).

The dynamic use of SNA by measuring social learning and friendship interactions over time allows researchers a number of new perspectives in understanding social interaction processes amongst students. It allows a deeper insight into how teachers can actively encourage learning across learners and groups. The main finding derived from this study is that while students may seem to be more content if they are allowed freedom in choosing their own group, research continues to show that major benefits can be reaped from making extra efforts in working in culturally diverse groups. Despite what may be the initial hesitations and difficulties facing cross-cultural learning, friendship and group work can be built over time as long as teachers and students are open-minded and committed.

Future research may extend the applications of SNA and the ABC model in particular by looking at more in-depth relationships between the students and exploring them qualitatively (e.g., see Rienties *et al.*, 2015). Studies can also look at the various group component measurements – for instance, by differing group tasks and group sizes as well as applying various formative and summative assessment methods as part of the experimentations. A longitudinal study – if possible, longer than one semester or eleven weeks (e.g., over one academic year or the entire duration of study) – that captures not only before and after measurements but also provides mid-measurement during the interim period may be useful in helping us understand the learning process and the influence of social networks and other factors on a particular individual.

## Implications for the affective-behavioural-cognitive framework

This study provided evidence on the close link of ABC theory and student cross-cultural learning, on how the social learning networks of students may have an impact on their affect, behaviour, and cognition. First, students are often forced to deal with stress and coping, although they are not yet familiar with both the learning environment and the educational system. Nevertheless, they manage to successfully negotiate their way through their academic performance. This suggests that cross-cultural learning can result in increasing students' affect in learning. Second, students maintained their

day-to-day activities by adapting their behaviours (e.g., having to adjust to an international classroom environment; working in a group with members from diverse cultures) throughout the module duration. This implies that students' behavioural formation is a positive result of the cross-cultural learning exercise. Nevertheless, the opposite is also true in that persistence in their behaviour can enhance their learning. Third, this study confirms that students' cognition (e.g., their performance on their coursework and exam) is strongly associated with their cross-cultural learning. In summary, cross-cultural learning is found to have a positive impact on students' affect, behaviour, and cognition. At the same time, students are required to be willing to change and adapt their affect, behaviour, and cognition in order to enhance their academic and social learning in their new higher-education environment.

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